

The *Leucophenga subpollinosa* Species Group of Japan and Southeast Asia (Diptera, Drosophilidae)

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Abstract Nine species of the *subpollinosa* species group of the genus *Leucophenga* MIK from Japan and Southeast Asia are reviewed taximetrically, with descriptions of two new species.

The *subpollinosa* species group of the genus *Leucophenga* MIK, 1886, was established by BÄCHLI (1971) for seven African and three Oriental species. BOCK (1979) included this species group (five Australian species) in his Group 2 together with *argentata* species group (one species). In the present work nine species of the *subpollinosa* species group of Japan and Southeast Asia are reviewed taximetrically, with descriptions of two new species.

Diagnosis. Body relatively small and slender. Frons usually pale yellow. Postverticals minute. Mesoscutum and scutellum silvery pollinose especially in male. Thoracic pleura with dark patches or stripes. Abdomen black, basal tergites silvery pollinose especially in male. Wing usually black along costa and below R_1 .

Leucophenga acutipollinosa sp. n.

(Fig. 1 A-C)

Leucophenga subpollinosa: OKADA, 1956. Syst. Study Dros. Japan: 30, not DE MEIJERE, 1914 (misidentification).

♂, ♀. Body about 2.0 mm in length. Antenna yellowish orange, 3rd joint greyish black, thrice as long as broad. Arista 6/3 and minute fork. Palpus yellowish orange, apically black. Frons pale, 2/7 as broad as head width, medially dark, parallel sided (♂) or caudally broadened (♀). Face pale yellow. Cheek yellowish grey, very narrow. Vibrissa strong, 2nd oral 1/3 as long as vibrissa. Mesoscutum yellowish brown, with greyish white pollinosity in male. Scutellum yellowish brown, laterally black. Thoracic pleura mat brown, with a short white longitudinal stripe along notopleural region. Humeral 2, upper longer. Prescutellars as long as anterior dorsocentrals. Acrostichal hairs in 6-8 rows. Anterior dorsocentrals 1/2 as long as posteriors. Lateral scutellars longer than apicals, which are nearer to each other than to laterals. Steno-index 0.7. Legs yellow, knee joints of mid and hind legs dark. Wing hyaline, costa and below R_1 black. C-index 2.5; 4V-index 2.1; 4C-index 1.1; 5x-index 1.8; Ac-index 3.0; C3-fringe 4/5.

Halter white. Abdominal tergites (Fig. 1 C) black, 1T yellowish grey, 2T yellow, silvery pollinose, 3T in male except caudal margin yellow and silvery pollinose. Periphallial organs (Fig. 1 A) brownish black; surstylus angular below, thus the specific name, cercus yellow. Phallic organs (Fig. 1 B) brown; paramere oblong; aedeagus rod-shaped, apically finely hairy.

Holotype ♂, Asakawa, Tokyo, IV. 1975 (NISHIHARU). Paratypes: allotype ♀, same data as holotype; 1 ♀, Oozu, Ehime, 3. VIII. 1973 (IKEDA); 2 ♂, 2 ♀, Bogor, Java, 27. VII. 1971 (IKEDA, KUROKAWA, OKADA); 1 ♀, Peradeniya, Sri Lanka, 17-19. VIII. 1971 (OKADA); 1 ♀, Muara Mongkos, Sarawak, 25-27. XI. 1975 (SHIMA); 2 ♀, Pekanbaru, Sumatra, 3-4. VIII, 1971 (IKEDA).

Distribution. Japan, Borneo, Java, Sumatra, Sri Lanka.

Relationships. This species resembles *L. subpollinosa* in wing patches and abdominal coloration, but differs in having halter white, mesoscutum and scutellum in male entirely silvery pollinose and surstylus angular below.

Remarks. One female specimen collected in Aburatsubo, Kanagawa, has knob of halter black.

Leucophenga formosa n. sp.

(Fig. 1 D-F)

♂. Body about 2.2 mm in length. Antenna with 2nd joint yellowish orange, 3rd yellow, silvery pollinose. Arista 8/3 and small fork. Palpus yellowish orange, slender, with a few stout black setae below. Ocellar triangle black, silvery pollinose. Clypeus orange brown. Periorbits white. Frons white, narrow, parallelsided, caudally about 1/3 as broad as head width. Face greyish white, flat, pruinose. Check very narrow, yellowish grey. Occiput black. Anterior reclinate orbital slightly behind and outside proclinate. Second oral weak, half as long as vibrissa. Mesoscutum orange brown, caudal margin black, silvery pollinose in male. Scutellum mat greyish brown, laterally black, silvery pollinose in male. Thoracic pleura greyish yellow, with a broad black longitudinal stripe above. Only one strong humeral. Prescutellars well developed. Acrostichal hairs in about 6 sparse rows. Lateral scutellars divergent, longer than apicals, which are equally apart from each other and from laterals. Length distance of dorsocentrals 2/7 cross distance. Sterno-index 0.8. Legs yellowish white, knee joints of mid and hind legs black. Wing hyaline, black below R_1 and along costa; R_{2+3} gently curved to costa; R_{4+5} and M parallel. C-index 3.4; 4V-index 2.3; 4C-index 1.0; 5x-index 2.0; Ac-index 2.0; C3-fringe 3/4. Halter milky white. Abdominal tergites (Fig. 1 D) silvery pollinose, 1-3T yellowish white, 2-3T laterally black, 4T anteriorly yellowish white. Periphallial organs (Fig. 1 E) pale, epandrium and cercus dark below, surstylus oval. Phallic organs (Fig. 1 F) yellowish brown; aedeagus pale, bare, anterior paramere brown, elliptical, medially with a few sensilla.

Holotype ♂, Puli, Nantou, Formosa, 19. VIII. 1966 (OKADA).

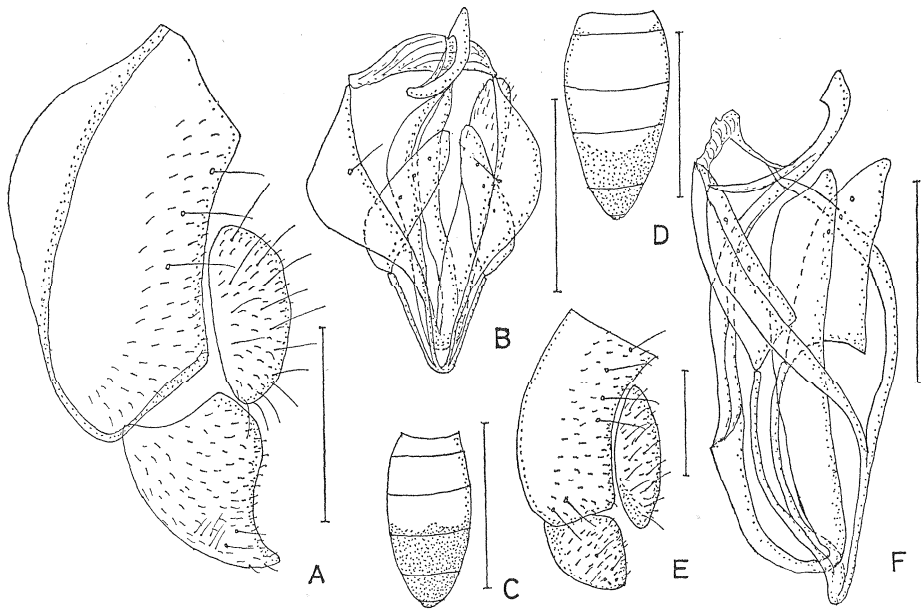


Fig. 1. A–C, *Leucophenga acutipollinosa*; D–F, *L. formosa*. A, E, Periphallic organs; B, F, phallic organs; C, D, male abdomen. Scales 1.0 mm for abdomen, 0.1 mm for other figures.

Distribution. Formosa.

Relationships. This species resembles *L. acutipollinosa* in the coloration of body and wing, but differs in having palpus pale, C-index larger, surstylus rounded and aedeagus barc.

Leucophenga subpollinosa (DE MEIJERE)

Drosophila (Leucophenga) subpollinosa DE MEIJERE, 1914, Tijdschr. Ent., 57: 263.

Diagnosis. Palpus yellow. Frons yellowish brown, laterally white. Mesoscutum yellowish brown, laterally silvery and with dark brown longitudinal stripe. Scutellum yellowish brown. Wing with costa and below R_1 black. Halter yellow, knob apically black. Abdominal tergites mostly black, 1–3T in male tan, silvery pollinose; 2T silvery pollinose in female. Surstylus rounded.

Specimens examined. 3 ♀, Pukae Botanical Garden, Saraburi, Thailand, 23. III. 1982 (SUGIYAMA, through KUROSA).

Distribution. Ryukyus, Formosa, Vietnam, Thailand (n. loc.), Nepal, India, Malaya, Java, Sumatra, Borneo, Philippines, Australia.

Leucophenga costata OKADA

Leucophenga costata OKADA, 1966, Bull. Br. Mus. nat. Hist. (Ent.), Suppl., 6: 19.

Diagnosis. Palpus yellowish brown. Frons yellowish grey. Mesoscutum yellowish brown. Scutellum brownish black, laterally black. Wing fuscous along costa and below R_1 . Halter yellow. Abdominal tergites mostly black.

Distribution. Nepal.

Leucophenga umbratula DUDA

Leucophenga umbratula DUDA, 1924, Arch. Naturg., 90A (3): 187. LIN & WHEELER, 1972, Univ. Texas Publ., (7213): 253.

Diagnosis. Palpus yellow. Frons pale yellow. Mesoscutum mat yellowish brown. Scutellum yellowish brown, laterally black. Wing without black patch below R_1 and along costa. Halter yellow. Abdominal tergites mostly black, 2T yellow, laterally black.

Specimen examined. 1 ♀, Puli, Nantou, Formosa, 19. VIII. 1967 (OKADA).

Distribution. Formosa.

Leucophenga nigroscutellata DUDA

(Fig. 2 A-D)

Leucophenga nigroscutellata DUDA, 1924, Arch. Naturg., 90A (3): 237.

Diagnosis. Palpus black. Frons brown. Mesoscutum yellowish brown. Scutellum black, apically pale. Thoracic pleura brown, with dark patches. Wing fuscous along costa. Halter yellowish white. Abdomen (Fig. 2 C, D) black. 1T and 2T medially and 3T in male anteriorly yellowish, silvery pollinose. Periphallallic organs (Fig. 2 A) dark brown; cercus paler; surstylus quadrate. Phallic organs (Fig. 2 B) dark brown, aedeagus pubescent.

Specimens examined. 1 ♂, Tugu, Java, 27-30. VII. 1971 (OKADA); 1 ♂, Tjibodas, Java, 28. VII. 1971 (IKEDA); 1 ♂, Cameron Highlands, Malaya, 27. X. 1975 (SHIMA).

Distribution. Formosa, Nepal, Malaya (n. loc.), Java.

Leucophenga flavicosta DUDA

Leucophenga subpollinosa var. *flavicosta* DUDA, 1926, Suppl. ent., 14: 53.

Leucophenga flavicosta: BÄCHLI, 1971, Exploration de Parc National de l'Upemba, Bruxelles, p. 59; LIN & WHEELER, 1972, Univ. Texas Publ., (7213): 245; BÄCHLI, 1973, Viertelj. Naturforsch. Gesell., Zurich, (118): 24.

Leucophenga subpollinosa: WHEELER & TAKADA, 1964, Ins. Micronesia, 14: 229 (not DE MEIJERE, 1914)

Diagnosis. Palpus yellow. Frons and mesoscutum in male silvery pollinose.

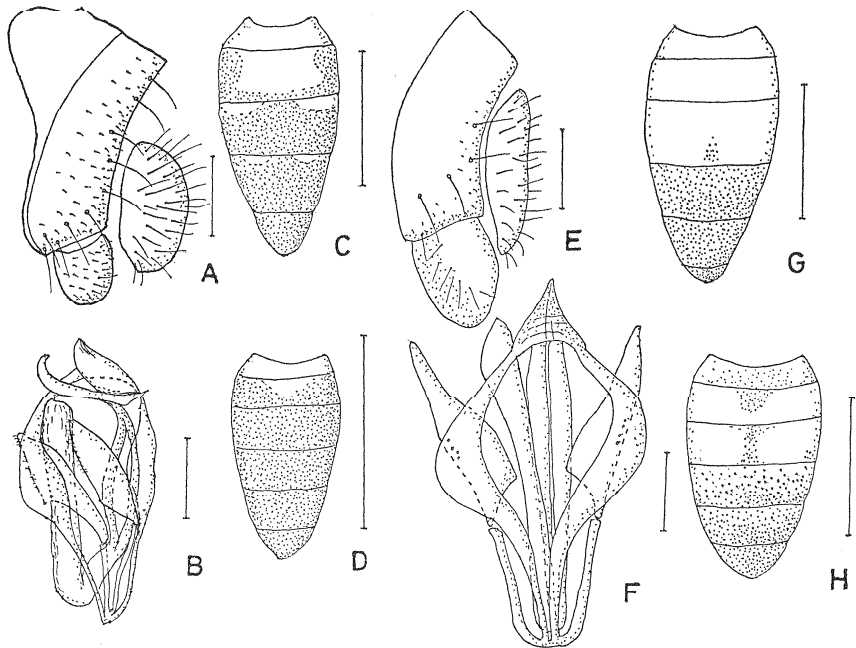


Fig. 2. A-D, *Leucophenga nigroscutellata*; E-H, *L. argentina*. A, E, Peripheral phallic organs; B, F, phallic organs; C, G, H, male abdomen; D, female abdomen. Scales as in fig. 1.

Thoracic pleura with dark longitudinal stripe. Wing with costa pale, without black stripe below R_1 . Halter yellow, with tip of knob black. Abdominal tergites 1-3T in male silvery pollinose, 3T with narrow black caudal band. Surstylus rounded; aedeagus bare (according to WHEELER & TAKADA, 1964).

Distribution. Formosa, Java, Sumatra, Micronesia, New Guinea.

Leucophenga lacteusa TAKADA et WAKAHAMA

Leucophenga lacteusa TAKADA et WAKAHAMA, 1967. Annot. zool. japon, 40: 56.

Diagnosis. Palpus yellow. Frons yellowish white. Mesoscutum silvery pollinose. Scutellum yellow. Wing without black patches along costa and below R_1 . Halter yellow. Abdominal tergites 1-3T mostly whitish. Surstylus rounded. Aedeagus hairy.

Distribution. Ryukyu, Japan.

Leucophenga argentina (DE MEIJERE)

(Fig. 2 E-H)

Drosophila (Leucophenga) argentina DE MEIJERE, 1924, Tijdschr. Ent., 67, Suppl.: 46.

Leucophenga argentina: DUDA, 1924. Arch. Naturg., 90A (3): 187.

Diagnosis. Palpus pale yellow. Frons pale yellow, white pollinose. Meso-

scutum whitish yellow, silvery pollinose. Scutellum laterally black. Wing with black patch along costa and below R₁. Acrostichal hairs in about 10 rows. Abdominal tergites (Fig. 2 G, H) silvery pollinose, 2-3T mostly pale yellow, 4-6T black. Surstylus (Fig. 2 E) rounded. Aedeagus (Fig. 2 F) bare.

Specimens examined. 2 ♂, Saiyok, Kanchanaburi, Thailand, 11. XI. 1975 (SHINONAGA).

Distribution. Sumatra, Thailand (n. loc.).

Remarks. This species has body and wing colorations and fine postverticals as characteristic of the species group, but it differs from the ordinary member in having body larger and acrostichal hairs in about 10 rows.

Taximetric Analyses

The relationships of nine species (n=9) of this species group of Japan and Southeast Asia are taximetrically analysed using twelve diagnostic characters (t=12), each coded in 2 states (0, 1). MCD proximity analysis and UPGMA cluster analysis are applied for constructing dendrogram of relationships. From the resulting dendrogram (Fig. 3) a key to the species is automatically devised.

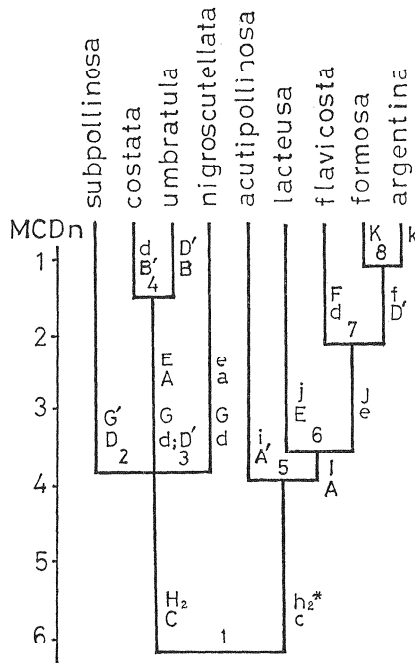


Fig. 3. A dendrogram of the relationships of the *subpollinosa* species group species, constructed by means of MCD proximity analysis and UPGMA cluster analysis. Numerical figures on the branching points of dendrogram correspond to the order of key couplets; alphabetical signs on the branches are the diagnostic character states chosen from the original n x t matrix. * Excluding *L. formosa*.

- A Palpus yellow (A=0) or black (a=1).
 B Frons whitish (B=0) or brownish (b=1).
 C Mesoscutum yellowish brown (C=0) or silvery pollinose (c=1).
 D Scutellum yellow (D=0), silvery pollinose and laterally black (D'=0.5), or brownish black (d=1).
 E Wing cl_r^{2a} (E=0) or costa and below R_1 black (e=1).
 F C-index 2.5 or less (F=0) or 3.0 or more (f=1).
 G Halter yellow (G=0), yellow with knob black (G'=0.5), or black (g=1).
 H₁ 3T in male black (H₁=0) or yellow and silvery pollinose (h₁=1).
 H₂ 3T in female black (H₂=0) or yellow and silvery pollinose (h₂=1).
 I Surstylus rounded (I=0) or angular (i=1).
 J Aedeagus bare (J=0) or hairy (j=1).
 K Acrostichal hairs in 6-8 rows (K=0) or 10 or more rows (k=1).

Original n × t Matrix

	A	B	C	D	E	F	G	H ₁	H ₂	I	J	K
<i>L. subpollinosa</i>	0	0.5	0	0	1	0	0.5	1	0	0	0	0
<i>L. costata</i>	0	0.5	0	1	0	0	0	NC	0	NC	NC	0
<i>L. umbratula</i>	0	0	0	0.5	0	0	0	0	0	NC	NC	0
<i>L. nigroscutellata</i>	1	1	0	1	1	0	0	1	0	0	1	0
<i>L. acutipollinosa</i>	0.5	0	1	0.5	1	0	0	1	1	1	1	0
<i>L. flavicosta</i>	0	0	1	1	1	0	0	1	1	0	0	0
<i>L. formosa</i>	0	0	1	0.5	1	1	0	1	NC	0	0	0
<i>L. lacteusa</i>	0	0	1	0	0	1	0	1	1	0	1	0
<i>L. argentina</i>	0	0	1	0.5	1	1	0	1	1	0	0	1

**Key to the Species of the *L. subpollinosa* Species
Group of Japan and Southeast Asia**

1. Mesoscutum yellowish brown (C); 3T in female black (H₂)..... 2
 — Mesoscutum silvery pollinose (c); 3T in female yellow (h₂), excluding *formosa* (NC) 5
2. Scutellum yellow (D); halter with knob black (G').....*subpollinosa*
 — Scutellum brownish or silvery pollinose and laterally black (D' or d); halter yellow (G) 3
3. Palpus black (a); wing with costa and below R_1 black (e).....
 *nigroscutellata*
 — Palpus yellow (A); wing clear (E)..... 4
4. Frons yellowish (B'); scutellum brownish black (d).....*costata*
 — Frons whitish (B); scutellum silvery pollinose, laterally black (D').....
 *umbratula*
5. Palpus yellowish brown (A'); surstylus angular (i)..... *acutipollinosa*
 — Palpus yellow (A); surstylus rounded (I)..... 6

- 6. Wing clear (E); aedeagus hairy (j).....*lacteusa*
— Wing with costa and below R₁ black (e); aedeagus bare (J)..... 7
- 7. Scutellum brownish black (d); C-index 2.5 or less (F).....*flavicosta*
— Scutellum silvery pollinose, laterally black (D'); C-index 3.0 or more (f) ..
..... 8
- 8. Acrostichal hairs in 6-8 rows (K).....*formosa*
— Acrostichal hairs in about 10 rows (k).....*argentina*

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